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a <u>Transmission Control Protocol</u> (TCP) handshake, the communications link
having a congestion window set to an initial length;

(ii)   transmitting data packets <u>in TCP</u> from the transmitter to the receiver;

(iii)   detecting a missing data packet at the receiver;

(iv)   sending <u>a negative acknowledgment from the receiver to the transmitter for the
         missing data</u> packet, the receiver being unresponsive to any packets from the
         transmitter unless the receiver detects the missing data packet;

(v)   <u>decreasing</u>, at the transmitter, <u>the length of the congestion window</u> in response
         to receipt of the negative acknowledgment; and

(vi)   re-transmitting the missing data packet.

[3] According to claim 1 of the present invention, therefore, a receiver sends a NAK to a
transmitter when it detects a missing data packet, and the transmitter decrease a
congestion window in response to a receipt of the <u>NAK in a data communication
network employing TCP protocol</u>. According to claim 11, a receiver sends a NAK to a
transmitter when it detects a missing data packet, and then sets a missing-packet
timer. When the time is expired and the missing data packet has not been received,
the receiver sends a further NAK to the transmitter. Round-trip time (RTT) is a
measure of the time it takes for a packet to travel. Transport protocols like TCP which
expect an acknowledgment to arrive after data has been successfully received, keep
an estimate of the current RTT on each connection. UDP does not have RTT.
According to claim 22, a transmitter sets a (TCP) round-trip timer on sending a
sequence of data packets, and adjusts a congestion window in response to receipt of
the NAK and expire of the round-trip timer.

[4] Applicant notes that Hamilton et al. (US 6,392,993, hereinafter referred to as
Hamilton) has been cited in all rejections under 35 USC 103. Hamilton, however, is
directed to "method and computer program product for <u>efficiently</u> and <u>reliably</u> sending
small data messages <u>from a sending system to a large number of receiving
systems</u>". The title of Hamilton patent clearly and adequately lists the technical
requirements in the Hamilton patent: 1. sending small data messages; 2. efficiency;
3. reliability; 4. from <u>a</u> system; and 5. to <u>a large number</u> of receiving systems. A
person skilled in the art will readily appreciate that "<u>from a sending system to a large
number of receiving systems</u>" is a characteristic of a <u>multicast</u> or a <u>broadcast</u> system.

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[5] Throughout Hamilton it is clear that Hamilton is based upon UDP protocol to achieve
the five elements listed above, and at the same time, teaches away from the use of
TCP protocol. A fundamental difference between the UDP protocol and the TCP
protocol is that UDP is a connectionless protocol in the transport layer of the OSI
model, while TCP is a connection-oriented protocol. Using connection-oriented
protocol, terminals of a communication link exchange data first to declare towards
each other that they want to do so. This is called "establishing a connection" or
"handshake". A connection is always a point-to-point unicast. In connectionless mode
transmission is transmission in which each packet is prepended with a header
containing a destination address sufficient to permit the independent delivery of the
packet without the aid of additional instructions. Connectionless protocols allow for
multicast and broadcast operations, however, it usually cannot be guaranteed that
there will be no loss, error insertion, misdelivery, duplication, or out-of-sequence
delivery of the packets.

[6] Hamilton therefore stated at column 1, lines 46 to 56, when discussing the
background of the invention:

> One way to ensure reliability is to communicate with each and every receiving system
> using a connection based protocol, such as TCP over an IP network. In a connection
> based protocol, one system forms a connection to another system, transacts all
> communication with that system, and terminates the connection. If communication with
> multiple systems is desired, a connection is formed with each system, in turn. The
> overhead associated with creating and managing a connection between a sending
> system and a number of receiving systems is prohibitively expensive when there are a
> large number of receiving systems.

[7] Here, Hamilton stated that TCP is reliable but not efficient for "a connection between
a sending system and a number of receiving systems".

[8] Hamilton moved on to describe the UDP system at column 1, lines 57 to 67:

> In order to reduce the overhead associated with connection based protocols,
> connectionless protocols, such as UDP over an IP network, have been developed.
> Connectionless protocols typically rely on a broadcast or "multicast" model where a
> single message is broadcast to a multiple receiving systems without forming a
> connection with the individual systems. This approach eliminates the overhead
> associated with forming connections with each system, but suffers from the inability to
> guarantee receipt of messages to all systems. For IP networks, multicast is unreliable
> by design in order to reduce overhead of sending packets to multiple destinations.

[9] Here, Hamilton stated that UDP is efficient but not reliable for "a connection between
a sending system and a number of receiving systems".

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[10] Hamilton stated in the summary of the invention, at column 3, lines 3 to 21:

> To overcome the problems in the prior art, two protocols have been developed. The base protocol, generally referred to as Statistically Reliable Transmission or statistical reliability mode, relies on a probabilistic model that can be tuned to reduce the probability that any single system did not receive a message to an arbitrarily small number thus essentially ensuring that all systems receive a message. For those situations that the statistical model is insufficient and receipt must be guaranteed, minor modifications can be made to the protocol to produce a Positive Reliability Transmission protocol or positive reliability mode where systems that do not receive a message can be identified and steps can be taken to ensure they receive the message. [...]
> Both protocols are based on UDP and both protocols multicast UDP packets to one or many recipients. The basic protocol relies on the transmission of multiple packets.

[11] and in the detailed description at column 7, lines 53 to 66:

> The present invention achieves both efficiency and reliability by building high-level protocols upon a basic UDP multicast protocol. Since UDP is inherently unreliable, reliability is added by layering additional protocols upon UDP. The result is a protocol that achieves the efficiency of UDP multicast with very high reliability. Embodiments within the present invention can operate in either a statistical reliability mode or a positive reliability mode. The statistical reliability mode can be adjusted to lower the probability that any system did not receive a message to a very small number. The positive reliability mode adds to the functionality of the statistical reliability mode by further providing senders with the knowledge of which intended recipients did and did not receive the message.

[12] It should be, therefore, apparent to a person skilled in the art that Hamilton is directed to "method and computer program product for efficiently and reliably sending small data messages from a sending system to a large number of receiving systems" based upon UDP protocol.

[13] Responsive to section 3 of the Office Action, wherein the Examiner states:

> Claims 1, 10-12, 14, 22-23 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable[45] over Hamilton, in view of Kadansky et al (US Patent No. 6,507,562), hereinafter, Kadansky.
>
> For claims, 1, 11-12, 22, and 28-29, Hamilton discloses, "a method for error recovery (refer to col. 19 lines 57-67 [15,16], congestion control and transmission control in a data communication, refer to abstract[17,18], col. 1 lines 24-31[19,20], col. 31 lines 12-17[21,22], comprising:
>
> - a communication link between a transmitter and the receiver being established through a TCP handshake, col. 1 lines 46-53[23] and col. 8 lines 39-45[24];
>
> - a communication window set to an initial length (transmission rate), refer to col. 15 lines 30-35[25,26] and col. 31 lines 50-51[27,28];
>
> - transmitting data packets from the transmitter to the receiver, abstract (lines 3-4)[29], col. 2 lines 44-48[30,31];

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- detecting a missing packet at the receiver, as recited by claims 1, 11-12, and 22, refer to col. 19 lines 57-67[32] and col. 31 lines 19-23[33]; setting a timer (NAK wait timer is started), refer to col. 19 lines 57-59[32];

- sending a negative acknowledgment from the receiver to the transmitter for the missing data packet, refer to col. 13 lines 23-24[34,35], col. 31 line 65[36] and col. 32 lines 29-34[37];

- where the missing packet is not received at the receiver in response to the negative acknowledgment before expiry of missing –packet timer, sending a further negative acknowledgment, recited by claim 23, refer to col. 20 lines 10-11;

- decreasing at the transmitter, the length of the congestion window in response to receipt of negative acknowledgment, refer to col. 16 lines 20-37[38,39];

- re-transmitting the missing packet. Refer to col. 3 line 60[40,42], col. 14 lines 13-18[41,42].

Kadanskiy discloses "NACK for missing packets only", refer to col. 1 line 65[43,44] through col. 2 line 16 (An example of a reliable unicast protocol is the well known TCP/IP protocol).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the capability of using NACKs, as taught by Kadansky[45]. The NACKs are integrated (combined) into the receiver. The suggestion/motivation to do so would have been to ensure the re-transmission of packets by sender to receiver.

[14] Applicant respectfully disagrees and traverses the Examiner's rejections. **Following paragraphs [15] to [45] are a detailed discussion as to why the Examiner's rejections are without merit.. Superscripts in the Examiner's statement in paragraph [13] are cross-references to the paragraph numbers in the following comments.**

[15] Hamilton stated at column 19 lines 57-67:

When a gap in the packet sequence is detected by the reception of a packet with a non-sequential packet sequence number, a NAK wait timer is started. At the expiration of the NAK wait time, a NAK is transmitted to sending system 144 to notify sending system 144 that a packet has been missed. Embodiments within the scope of this invention may comprise means for transmitting a request for packet retransmission. By way of example, and not limitation, in FIG. 8 such means is illustrated by NAK timer 152. NAK timer 152 may watch message receive list 150 to detect non-sequential packet numbers.

[16] Here, Hamilton was discussing statistical reliability mode, which, as stated above in paragraphs [10] and [11], and readily appreciated by a person skilled in the art reading the specification as a whole, in particular from column 7, line 53 column 19, line 67, is implemented on UDP protocol. Applicant notes that Hamilton teaches NAK when implementing the two "high-level protocols upon a basic UDP multicast protocol", here, a NAK wait timer is necessary since the high-level protocol is based

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on statistical reliability, however, Hamilton does not teach or suggest using NAK in

conjunction with TCP, a connection oriented protocol.

[17] Hamilton stated in the Abstract:

> In a network with a sending system networked to at least one receiving system, it is
> sometimes desirable to transfer relatively short messages between the sending
> system and one or more receiving systems in a highly reliable yet highly efficient
> manner. The present invention defines two short message protocols, one of which
> relies on a statistical model and the other of which uses positive acknowledgement to
> track receipt of transmitted packets by intended recipient. The statistical reliability
> mode is based on the observation that for each packet in a message that is
> transmitted, the probability that at least one packet of the message is received by a
> given system increases. Thus, in the statistical reliability mode messages are divided
> into a guaranteed minimum number of packets, with additional packets being added if
> the message length is insufficient to fill the minimum number of packets. The positive
> reliability mode of the present invention periodically sets an acknowledgement flag in
> the packets transmitted for a message. Receiving systems send an acknowledgement
> in response to receipt of that packet. The sending system tracks receipt of
> acknowledgements by intended recipient and retransmits any unacknowledged
> packets so as to positively assure the packets are received. Receiving systems send
> negative acknowledgements to request retransmission of missing packets. Negative
> acknowledgement suppression is implemented at both the sender and receiver to
> prevent a flood of negative acknowledgements from overwhelming the network.
> Packets are transmitted by the sending system at a transmission rate selected to
> avoid any adverse impact on the packet loss rate of the network.

[18] Reading in the context, Hamilton discussed in the Abstract that the "statistical

reliability mode" and the "positive reliability mode" aspects of the Hamilton patent to

transfer relatively short messages between the sending system and one or more

receiving systems in a reliable and efficient manner. It should be apparent to a

person skilled in the art, as discussed in the above paragraphs [5] to [11], and [15] to

[16] that this is directed to high-level protocols upon a basic UDP multicast protocol.

Applicant notes that negative acknowledgement is used in Hamilton in the

implementation of the high-level protocols. Hamilton does not teach or suggest the

use of NAK in TCP protocol.

[19] Hamilton stated at column 1, lines 24 -31:

> The field of the present invention relates to small data message transmission from a
> sending system to a plurality of networked receiving systems. Such data
> communication is useful for centrally monitoring and controlling systems
> simultaneously. More particularly, the present invention deals with techniques for
> reliably making the transmission while simultaneously reducing the network traffic
> associated with such reliability.

[20] Similar to the discussion in paragraph [4], Hamilton described here: the technical

requirements in the Hamilton patent: 1. sending small data messages; 2. efficiency;

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3. reliability; 4. from a system; and 5. to a plurality of networked receiving systems. A person skilled in the art will readily appreciate that "from a sending system to a plurality of networked receiving systems" is a characteristic of a multicast or a broadcast system. Hamilton does not teach or suggest the use of TCP protocol.

[21] Column 31, lines 12 -17 is the preamble of claim 1 in Hamilton which reads:

> 1. In a network comprising a sending system networked together with at least one receiving system, a method for efficiently and reliably transmitting a data message from the sending system to the at least one receiving system in a manner that minimizes network traffic while maintaining high reliability, the method comprising the steps of: [...]

[22] Hamilton's claim 1 is set in "a network comprising a sending system networked together with at least one receiving system", although UDP is normally used in multicast and broadcast systems, it can also be used in point-to-point system, hence the "at least one receiving system". However, Applicant notes that this preamble does not change the fact that Hamilton is directed to a high-level protocols upon a basic UDP multicast protocol as discussed, for example, in paragraphs [10], [11] and [18] because of the fundamental difference between the UDP protocol and the TCP protocol as discussed above in the paragraph [5].

[23] Column 1, lines 46 -53 in Hamilton was discussed above in paragraphs [6] to [9], TCP was used as an example of connection based protocol when discussing the background of Hamilton invention. Column 8, lines 39-45 of Hamilton stated:

> WinSock layer 64 provides an Application Program Interface (API) that allows higher level access to both TCP layer 60 and UDP layer 62. The Windows Sockets API provided by WinSock layer 64 provides a standardized Windows interface to various transports, such as TCP, UDP and IP so that the lower level details of the transports are hidden from the higher levels.

[24] Column 8, lines 39-45 of Hamilton is a description of Figure 3 and states that WinSock provides an API for upper layers access to transport layer protocols such as TCP or UDP. It does not teach "a communication link between a transmitter and the receiver being established through a TCP handshake" as suggested by the Examiner.

[25] Column 15, lines 30 -35 in Hamilton states:

> Each of these is properly an example of means for selecting a transmission rate. Pacing algorithms that perform well, however, should have certain characteristics. In general, the transmission rate for a sender will be limited between some minimum and

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some maximum value.

[26] Here, Hamilton is discussing the pacing algorithm in the frame work of statistical
reliability mode of the higher level protocols upon UDP, which was illustrated in
Figure 7 and first introduced at column 14, line 66 and continues to column 15, line
54. That the pacing algorithm is used in UDP based protocol, is better illustrated as
follows, continuing the discussion above in paragraphs [10] to [12]. Hamilton stated
in column 3, lines 19 -32:

> Both protocols are based on UDP and both protocols multicast UDP packets to one or
> many recipients. The basic protocol relies on the transmission of multiple packets.
> Thus, when a message fills less than a specified minimum number of packets, the
> message is expanded to fill the required minimum number of packets. The packets
> are numbered so that a recipient can determine if the entire message has been
> received. The packets are sent to the intended recipients using a pacing algorithm that
> regulates the speed at which packets are sent. The pacing algorithm recognizes that
> the packet transmission rate generally influences the packet loss rate in the network.
> Pacing the packets prevents the packet transmission rate from adversely influencing
> the packet loss rate.

[27] Column 31, lines 50 -51 in Hamilton is the last element of claim 2 which states:

> [...] said sending system resending transmission packets which should have been
> acknowledged but which remain unacknowledged.

[28] Column 31, lines 50 -51 in Hamilton, therefore, does not teach or suggest "a
communication window set to an initial length" as suggested by the Examiner.

[29] Lines 3-4 of the Abstract in Hamilton states:

> [transfer relatively] short messages between the sending system and one or more
> receiving systems in a highly reliable yet highly [efficient manner].

[30] Column 2, lines 44-48 in Hamilton states:

> It is an object of the present invention to reduce the amount of network traffic
> associated with reliably sending a small data message from a sending system to a
> number of receiving systems.

[31] As discussed in paragraphs [5], [10] and [11], a person skilled in the art when
reading Hamilton, will readily appreciate that the above two citations are for multicast
transmission based on UDP.

[32] The fact that the text at column 19, lines 57 -67 in Hamilton does not teach or
suggest using NAK in conjunction with TCP, has been discussed above in the
paragraphs [15] and [16]. Furthermore, Applicant notes that the present application

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as claimed by the claims presently on file, does not include a NAK wait timer for
transmitting NAK at the expiration of the NAK wait time.

[33] Column 31, lines 19 - 23 of Hamilton is the first element of claim 1, and describes
the step how the message is sent:

> dividing the message to be sent into a plurality of data blocks and placing each data
> block into a sequentially identified transmission packet, and if the total number of
> transmission packets is less than a defined minimum number, [then creating
> additional sequentially identified transmission packets until said defined minimum
> number are available];

How the message is received is defined at column 31, lines 29 – 35. Therefore,
Applicant notes that Column 31, lines 19 to 23 of Hamilton does not teach or
suggest "detecting a missing packet at the receiver, as recited by claims 1, 11-12,
and 22" as stated by the Examiner.

[34] Column 13, lines 23-24 in Hamilton states:

> [Ideally, only a sufficient number of systems would respond] with NAKs to guarantee
> that the sender received one NAK for each packet that was missed.

[35] Reading from the context, and as discussed in above paragraphs [5], [10] and
[11], it should be apparent to a person skilled in the art that this is referring to
high-level protocols upon a basic UDP multicast protocol. For example, the
text in Hamilton from column 12, line 66 to column 13, line 26 reads:

> Retransmission of packets requested in a NAK may result in systems that received
> no packets or systems that received less than all the packets receiving more packets
> than they received initially. Based on the statistical model above, each rebroadcast
> of one or more packets increases the statistical likelihood of the systems receiving
> all necessary packets. The NAK/retransmit procedure can be continued for a
> designated period of time or until certain statistical criteria are met.

> Although conceptually the above description results in the ability to diminish the
> statistical likelihood of any systems not receiving the information they need to an
> arbitrary minimum, in reality such an approach would create severe problems in
> many practical installations. Using an example previously presented, if the packet
> loss rate was twenty percent and if three packets were transmitted to one thousand
> recipients, statistically we could expect that 512 recipients would receive all three
> packets, 480 recipients would receive one or two packets, and eight systems would
> receive no packets. If all 480 systems sent NAKs to the sender, the volume of
> network traffic may completely overwhelm the network. As the numbers of systems
> in a network increase, the problem becomes more pronounced and more serious.
> Ideally, only a sufficient number of systems would respond with NAKs to guarantee
> that the sender received one NAK for each packet that was missed. Practically,
> although achieving this ideal is difficult, various steps may be taken to reduce the

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flood of NAKs.

[36] Column 31, line 65 in Hamilton is part of claim 5 which depends on claim 1, and
reads:

> setting a negative acknowledgement wait timer value at each receiving system

Claim 1 has been discussed in paragraph [22] with regard to the fact that Hamilton
is directed to a high-level protocols upon a basic UDP protocol. Furthermore, that
the present invention does include a NAK timer is discussed in paragraph [32].

[37] Column 32, lines 29 -34 in Hamilton is the first element of claim 9 and, as discussed
in paragraph [34] describes the step how the message is sent, which reads:

> dividing the message to be sent into a plurality of data blocks each of which is
> carried by a sequentially identified transmission packet, and if the total number of
> transmission packets is less than a defined minimum number, then creating
> additional sequentially identified transmission packets until said defined minimum
> number are available;

How a NAK is sent from the receiver is not disclosed in claim 9. Therefore, Applicant
notes that column 31, line 65, and column 32, lines 29 -34 of Hamilton does not
teach or suggest "sending a negative acknowledgment from the receiver to the
transmitter for the missing data packet" as stated by the Examiner.

[38] Column 16, lines 20 – 37 in Hamilton reads:

> Another factor that may considered when designing a pacing algorithm is the
> statistics of received NAKs. For example, a steadily rising NAK rate may indicate
> degrading network conditions and steadily increasing packet loss rate. In such a
> situation, it may be desirable to construct a pacing algorithm that gradually reduces
> the transmission rate until the minimum is reached. Similarly, the pacing algorithm
> may respond to a steadily decreasing NAK rate by gradually increasing the
> transmission rate to the maximum value. For NAK rate increases or decreases that
> are of relatively short duration, such as might indicate a burst of dropped packets,
> the pacing algorithm should generally be immune to such bursts and leave the
> transmission rate relatively unchanged at the end of the burst. For NAK rates that
> are relatively steady above or below the desired threshold, the transmission rate
> should gradually be reduced to the minimum or raised to the maximum, respectively.

[39] That the pacing algorithm is directed to high-level protocols based upon UDP, and
thus is directed to a multicast system has been discussed above in paragraph [26].
As discussed above in paragraphs [5], [10] and [11], Hamilton is directed to high-
level protocols upon UDP in broadcast or multicast system, column 16, lines 20 – 37
is discussing the relationship between pacing algorithm and the NAK rate. Applicant
submits that the teaching at column 16, lines 20 – 37 in Hamilton does not teach or

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suggest "decreasing, at the transmitter, the length of the congestion window in
response to receipt of the negative acknowledgment" in a TCP connection.

[40] Column 3, line 60 in Hamilton reads:

In response to a NAK the sender will retransmit the missed packet.

[41] Column 14, lines 13 – 18 in Hamilton reads:

As previously described, recipients 114 that do not receive all packets in a message
may send a NAK to the sending system requesting retransmission of the appropriate
packets. This procedure is illustrated in FIG. 6 by NAK 116 being transmitted through
network 112 to sending system 104.

[42] Both texts at column 3, line 60 and column 14, lines 13 – 18 are describing
retransmitting of packets upon receiving NAK. However, as discussed in paragraph
[5], [10] and [11], this is in the context of high-level protocols upon UDP in broadcast
or multicast system. In fact, one can find in the same columns for the UDP limitation,
examples include: column 3, lines 3-32; and column 14, line 56 – 59.

[43] Column 1 line 65 to column 2, line 16 of Kadansky (US 6,507,562) reads:

Reliable point to point communication is established by use of sequence numbers in
packets transmitted by a sending station, and by the receiving station transmitting an
acknowledgement message (ACK message) or a negative acknowledgement
message (NACK message) to the sending station. The sending station maintains a
buffer containing messages which it has transmitted, and upon receipt of an ACK
message indicating that a packet having a particular sequence number has been
received, the sending station flushes that packet from its buffer. In the event that the
sending station either receives a NACK message, or does not receive an ACK
message during a certain timing period, then the sending station uses its buffer to
retransmit the packet. Reliable unicast communication is established by requiring the
sending station to retransmit packets until it has received an ACK message for each
packet which it transmitted. An example of a reliable unicast protocol is the well
known TCP/IP protocol.

[44] Kadansky described here the background, and the facts that there are ACK and NACK (NAK) messages in reliable point-to-point communication and that TCP uses ACK is a well known fact in the IETF's standard for TCP. What Kadansky does not teach or suggest is the use of negative acknowledgment in a TCP connection, and "decreasing, at the transmitter, the length of the congestion window in response to receipt of the negative acknowledgment" as claimed by the instant invention.

[45] Hence, Applicant submits that one skilled in the art, in view of Hamilton and Kadansky which teaches high-level protocols built upon a connectionless UDP protocol in a multicast or broadcast system, and mentions the fact that TCP uses ACK, respectively, would not have the motivation to a method for controlling congestion where a TCP connection is established for transmitting data in connection-oriented TCP protocol, wherein a negative acknowledgement is sent from the receiver to the transmitter and upon receiving the negative acknowledgement the transmitter decreases the congestion window.

[46] The above discussion in paragraphs [13] to [45], responsive to section 3 of the Office Action, is directed to patentable inventiveness of independent claims 1,11, 22, 28, and 29.

[47] Responsive to paragraph 6 of the Office Action where the Examiner stated:

> 6. Claims 4-6, 15-16, 19, and 30, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton, as applied to claims 1, 11 and 22 above, in view of Kadansky et al (US Patent No. 6,507,562), hereinafter, Kadansky, and in view of Kumar (US Patent No. 6,269,080).
>
> [...]
>
> Kumar discloses setting a round-trip timer at the transmitter upon sending the packet, as recited by claims 4 and 15; and "increasing the congestion window if no negative acknowledgment for the missing packet is received before expiry of the round trip timer, as recited by claims 5 and 15, fig. 12 B steps 1252 and 1257, and col. 14 lines 8-14 and col. 14 lines 33-37; determining the round trip time (Tsub.2), refer to col. 9 lines 60-62, and congestion window is doubled, as recited by claim 6, refer to col. 14 lines 33-36;
>
> It would have been obvious to a person of ordinary skill in the art at the time of the invention to use the capability of increasing the time of window (timer). The round trip timer can be implemented by combining the timer in the sender 108 of network 104 as taught by Hamilton, refer to fig. 6. The suggestion/motivation to do so would have been to increase the duration of the round-trip timer to wait for Nack resulting in less traffic of NACKs in the network.

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[48] Applicant notes that Kumar is also directed to a method for multicast file distribution
and synchronization in data networks. Specifically, Kumar teaches a mechanism for
distribution of a data file from a single source to a large number of receivers using
multicast distribution in wide area networks.

[49] Kumar not only does not teach the method for controlling congestion where a TCP
connection is established for transmitting data in connection-oriented TCP protocol, it
actually teaches away from it, for example, at the beginning of "Background of the
Invention" at column 1:

> Certain computer applications require reliable distribution of a single large file to a large
> set of receiving hosts. As known in the art, file distribution can be managed by either a
> multicast or unicast transmission. When dealing with a large number of receivers, the
> use of unicast protocols such as TCP is inefficient as it requires the sender to
> separately transmit data once to each target.

[50] Applicant submits that one skilled in the art, in view of Hamilton and Kadansky which
teaches high-level protocols built upon a connectionless UDP protocol in a multicast
or broadcast system, and mentions the fact that TCP uses ACK, respectively, and in
view of Kumar, which teaches a method for multicast file distribution and
synchronization in data networks, would not have the motivation to a method for
controlling congestion where a TCP connection is established for transmitting data in
connection-oriented TCP protocol, wherein a negative acknowledgement is sent from
the receiver to the transmitter and upon receiving the negative acknowledgement the
transmitter decreases the congestion window. Therefore, Applicant submits that
present application, as claimed by the independent claim 15, is patentably inventive
in view of Hamilton, Kadansky and Kumar.

[51] Responsive to paragraphs 3 to 10 of the Office Action, wherein the Examiner
rejected the dependent claims 2-7, 9-10, 12-14, 16-17, 19-20, 23-24, and 30,
Applicant submits that claims 2-7, 9-10, 12-14, 16-17, 19-20, 23-24, and 30 are
dependent upon claims 1, 11, 15, and 22, and inherit the patentable features as
discussed in the above paragraphs [13] to [50], and are patentable inventive in view
of Hamilton and additional cited references.

[52] The Applicant notes that the Examiner has applied eleven references for rejecting
the claims in the application. It is well known that for the issue of obviousness,
whenever the main reference has a gap in it, and it is necessary to rely on a second
reference in order to complete the teachings of the claim, a mosaic of references is

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permitted. The mosaic however, should be reasonable, insofar as the number of references being combined to show obviousness is concerned. In this case, the number of references involved strongly suggests that the invention is not obvious. Moreover, the eleven references were introduced and applied in successive Office Actions, thus not in compliance with MPEP 707.07:

> Switching from one subject matter to another in the claims presented by applicant in successive amendments, or from one set of references to another by the examiner in rejecting in successive actions claims of substantially the same subject matter, will alike tend to defeat attaining the goal of reaching a clearly defined issue for an early termination, i.e., either an allowance of the application or a final rejection.

[53] Applicant notes that even with the benefit of hindsight (which is impermissible), the references can not readily be considered. The references must suggest the modification/s. Absent such showing, the Examiner cannot use the Applicant's teaching to hunt through the prior art for the claimed elements, and then combine them as claimed. The mere fact that the applied art could conceivably be modified and combined so as to result in the combination defined by the claims of record, would not have made the modification obvious unless the applied art suggests the desirability of the modification and/or combination.

[54] It is, therefore, improper to use Applicant's claims as a road map to combine references for a rejection. *Grain Processing Corp. v. American maize Products Corp., 840 F.2d 902, 907, 5. U.S.P.Q.2d 1788, 1792 (Fed. Cir. 1988).* Moreover, there is no suggestion, inspiration, or motivation in the cited art that the references should be combined to reconstruct the claimed invention. Absent some incentive or suggestion in the prior art to support the combination, obviousness is not established. *AIR Vend Inc. v. Thorne Industries, Inc. 625 F.Supp. 1123, 229 U.S.P.Q. 505, 515 (D.Minn. 1985), aff'd 831 F. 2d 306 (Fed. Cir. 1987).*

[55] Responsive to paragraph 13 "Response to Argument" of the Office Action, Applicant notes that the Examiner's response to Applicant's argument based on Hamilton has been addressed in the above paragraphs. In particular, Examiner's response based on column 1, lines 24-31 of Hamilton has been addressed in paragraphs [19] and [20]; Examiner's response based on column 31, lines 12-17 of Hamilton has been addressed in paragraphs [21] and [22]; Examiner's response based on column 13, lines 23-24 of Hamilton has been addressed in paragraphs [34] and [35]; and Examiner's response based on column 16, lines 25-30 of Hamilton has been addressed in paragraphs [38] and [39]. In addition, Examiner's response based on

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column 1 line 65 to column 2, line 16 of Kadansky, although a new reason based on
a new reference, has been addressed in paragraphs [43] and [44].

[56] Responsive to paragraph 13 "Response to Argument" of the Office Action, where
the Examiner cited column 20, lines 50-52 of Hamilton, Applicant provides following
reply. Column 20, lines 50-52 of Hamilton states:

> Ideally, operator console 70 would receive only one NAK for each packet that was not
> received by any system in the network.

[57] Here, Hamilton is discussing NAK in a multicast system based upon UDP protocol.
The Examiner is referred to discussion in the above paragraphs. In particular,
paragraphs [5], [10] and [11]. The text surrounding the cited column 20, lines 50-52
provides a better understanding:

> Returning for a moment to FIG. 2, when operator console 70 multicasts a plurality of
> packets to end clients 76, some systems will receive all transmitted packets, some
> systems will receive less than all of the packets transmitted, and some systems will
> receive none of the packets transmitted. Ideally, operator console 70 would receive
> only one NAK for each packet that was not received by any system in the network. For
> example, if various systems in the network did not receive two packets among the
> many that were transmitted, then ideally operator console 70 would only receive one
> NAK for each of the two packets that were not received. Although it is difficult to
> achieve this ideal in practice, NAK suppressors that have certain characteristics can
> approach this ideal.

[58] Applicant notes, for example, that a person skilled in the art would readily appreciate
that Figure 2 is an example of multicast.

[59] Applicant has clearly distinguished the features disclosed in the Examiner's primary
reference Hamilton from the features of the present invention in paragraph [50]
based on discussions in paragraphs [14] – [48]. Therefore, Applicant notes that there
is no need to distinguish the present invention as claimed from the secondary
references (Chien, Natarajan) cited by the Examiner in section 13 of the Office
Action.

[60] It is thus respectfully submitted that the invention taught and defined herein by the
claims presently on file embodies patentable subject matter. The Examiner is
earnestly solicited to give favourable reconsideration to this application and pass it to
allowance.

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